EFFECTIVENESS OF HONEY DRESSING ON DIABETIC WOUND STATUS AMONG PATIENTS WITH DIABETIC FOOT ULCER IN URBAN COMMUNITIES, SALEM.

By

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ABSTRACT

Patients with diabetes are at great risk of developing lower extremity ulcers. The management of diabetic foot ulcers typically includes early recognition and appropriate clinical care. Recent advances in wound treatment include honey dressing, which has been successful in diabetic wounds. This study evaluates the effectiveness of honey dressing on diabetic wound status among patients with diabetic foot ulcer. This study was conducted in the urban communities of Salem. Quasi experimental research design was used and 60 samples were selected by convenience sampling technique. 30 samples were assigned to experimental and 30 samples to control group. The general information was collected and the diabetic wound status was assessed using the Bates-Jensen Wound Assessment Tool. After the pre-test, the honey dressing was demonstrated to the 30 samples in the experimental group. Post test was done after 21 days.

The findings shows that, in the experimental group, 19(63.33%) patients were in the age group of 60-65 years and 17(56.67%) were males; 11(36.67%) were graduates and 8(26.67%) were private employees; 11(36.67%) patients had habit of smoking and 7(23.33%) had habit of alcoholism; 22(73.33%) were non-vegetarians and 27(90%) had habit of wearing foot wear. 2(6.67%) patients had mild, 23(76.67%) had moderate and 5(16.67%) had severely unhealthy wound status in pre-test whereas 6(20%) had mild, 24(80%) had moderate and none had severely unhealthy wound status in post test. The pre-test and post test mean difference of diabetic wound status is 5.87. The ‘t’ value was 2.28 which shows that honey dressing was effective in improving the diabetic wound status of patients with diabetic foot ulcer at $p<0.05$ level. There was a significant association of diabetic wound status with their selected demographic variables like age, occupation and diabetic diet at $p<0.05$ level.

CHAPTER I

INTRODUCTION

"For every drug that benefits a patient, there is a natural substance that can achieve the same effect."

The word diabetes is a Greek word meaning a siphon i.e., a tap. As patients with diabetes had polyuria and passed water like a siphon, the 2nd century A.D. Greek physician, Aretus named the condition so. The word mellitus is a Latin word, which means honey and also refers to a bee.

Diabetes is previously known as the disease of the rich people. But now there is no partiality between the rich and poor and it has become the third leading cause of death. According to the American Diabetes Association (ADA) expert committee on 'the diagnosis and classification of diabetes mellitus', 2003, diabetes mellitus is a group of metabolic disease characterized by elevated levels of glucose in the blood (hyperglycaemia) resulting from defects in insulin secretion, insulin action, or both **(Smeltzer, S. C., & Bare, B. G., 2007).**

The number of people with diabetes in the world is expected to double between 2000 and 2030 i.e., it currently affects more than 194 million people worldwide and is expected to reach 333 million by 2025, with the maximum burdens falling upon developing countries **(Wild, S., et. al., 2004).**

Diabetes is common in Asian Indians. India has the greatest number of people with diabetes. Top 10 countries in number of diabetes are India, China, America, Indonesia, Japan, Pakistan, Russia, Brazil, Italy and Bangladesh. India is considered as the Diabetic capital of the world. It alone currently counts over 35 million people harbouring diabetes **(King, H., et. al., 1999).**

According to the Centre for Disease Control and Prevention Data factsheet, 2002, approximately 5% to 10% of people with diabetes have type I diabetes and 90% to 95% of people have type II diabetes **(Smeltzer, S. C., & Bare, B. G., 2007).**

The prevalence of diabetes in the urban areas of India have increased in the last 2 decades and in the urbanizing rural population, it was found to be midway between the rural and urban population **(Ramachandran, A. et. al., 2004).**

The chronic diabetic complications are macro-vascular complications (coronary artery disease, cerebro-vascular disease, and peripheral vascular disease), micro-vascular complications (kidney and eye disease) and neuropathic complications (disease of the nerves). The most common complication of diabetes in the lower extremity is the diabetic foot ulcer **(Smeltzer, S. C., & Bare, B. G., 2007).**

Diabetic foot ulcer comprises the typical sequence of events with a soft tissue injury of the foot, formation of a fissure between the toes or in an area of dry skin, or formation of a callus. Injuries are not felt by the patient with an insensitive foot. In the Behavioural Risk Factor Surveillance System, foot ulcers are defined as "any sores or irritations on the feet that took greater than 4 weeks to heal" **(Driver, R., et. al., 2003).**

According to the United States National Honey Board, 2003, honey is a sweet fluid. It is produced by honeybees and other insects from the flowers. Honey is a pure product that does not have addition of any other substance.

Apitherapy is a form of treatment which uses honey. It replenishes energy, enhances physical stamina and improves immune system. Honey is used as a traditional medicine for centuries **(Mullai, & Menon, 2007).**

Honey is an inexpensive moist dressing that has shown a promising effect in the medical literature. It has been used for reducing the potential for clinical infection and for accelerating wound healing **(Stephen, & Haynes, 2004).**

Honey's healing power has been known for more than 5000 years. The Ancient Greeks and many other people have used it, through the ages. It has been an ingredient of folk medicines for many years. Now, it is gaining more credibility with current medical and scientific communities.

The antibacterial property of honey was discovered by Van Ketel in 1892. This action was due to the production of hydrogen peroxide on dilution of the honey with wound exudates. Hydrogen peroxide is a well known antimicrobial agent, hailed for its antibacterial and cleansing properties in the clinical practice **(Henriques, & Brudzynski, 2006).**

Need for the Study

Since India is the top country in the number of diabetics and the prevalence is on a steady increase, the investigator developed a special interest towards an interventional study on diabetes. The investigator was very much concerned of the seriousness and enormous complications of diabetes and decided doing something useful to prevent at least any one of the complications.

The investigator found that worldwide there are more than one million amputations every year with up to 70% of these amputations related to diabetes The yearly risk of major amputation in patients with diabetes is approximately 5 to 6 times that of a non diabetic person which is 6.5% per year. The recurrence rate of ulcers can vary from 35% to 70% over a 5 years period **(Trautner, C., & Walsh, 1999).**

The International Diabetes Federation and International Working Group of the Diabetic Foot, 2005 said that, around the world, a lower limb is lost every 30 seconds due to diabetes. So, it is important to identify effective strategies to reduce amputation rates, both to improve quality of life and to decrease cost. Keeping in mind that, it makes the one affected independent and disabled, the investigator selected the diabetic foot ulcer as the problem to investigate.

In India, among the hospitalised diabetic patients, diabetic foot infection is the common cause. It is also found that a number of socio-cultural practices induce the diabetic foot infection. **(Most, R.S., & Sinnock, P., 1999).**

It has been estimated that the foot problems consume as much as 40% of scarce healthcare resources in some developing countries The economic and emotional consequences for the patient and the family can be enormous **(Shobhana, R,. et. al., 2000).**

The poor cannot afford for the treatment of foot ulcer as it has to be done daily, the investigator planned to demonstrate the procedure for dressing with a more cost effective solution so that they can be self efficient and affordable.

Diabetic foot ulceration remains one of the most challenging chronic wounds to successfully manage. Although significant progress has been accomplished due to casting and better wound care in the neuropathic ulcer, about one third to half of patients still may fail to heal **(Margolis, D.J., et. al., 2005).**

It is estimated that reductions in amputations rates between 45% and 85% can be achieved through the adoption and implementation of well organized diabetic foot care. During the last years, new trends and initiatives have been launched. Many studies have demonstrated that honey has better antibacterial, anti-inflammatory and

healing effects **(Jull, A. B., 2009).** So the investigator studied about the benefits of honey in detail.

The investigator discovered that even up to the Second World War, honey was being used for its antibacterial properties in treating wounds. Medicinal qualities of honey have taken a back seat with the advent of penicillin and other antibiotic drugs in the twentieth century. But this has to be changed.

Honey has a wide range of amino acids, vitamins and trace elements. All these also have direct nutrient effect on regenerating tissues. Dirt and debris from the wound bed is lifted by the osmotic outflow after the application of honey. Thus, the dressing is non-sticky and enables dressing change pain free **(Riddle, 2000).**

The investigator selected this honey as the intervention admired by its numerous actions on the wound healing. . So the investigator selected natural honey for dressing which has improved outcome, economic advantages and decrease antibiotic use and resistance. Domiciliary care is possible along with rapid return to work with its use**.**

Honey has been shown to give good results on a very wide range of wounds and it is therefore mystifying that there appears to be a lack of universal acceptance of honey as a wound dressing **(Molan, 2006).**

The purpose of conducting honey related studies is to improve its practice. Today scientists and doctors are rediscovering the effectiveness of honey as a wound treatment and the investigator also wished to promote its acceptance and practice in order to treat wound effectively. Thus the investigator decided to conduct this study.

Statement of the Problem

A study to Evaluate the Effectiveness of Honey Dressing on Diabetic Wound Status among Patients with Diabetic Foot Ulcer in Urban Communities, Salem.

Objectives

- To assess the diabetic wound status among patients with diabetic foot ulcer in experimental and control group.
- To evaluate the effectiveness of honey dressing on diabetic wound status among patients with diabetic foot ulcer in experimental and control group.
- To associate the diabetic wound status among patients with diabetic foot ulcer in experimental and control group with their selected demographic variables.

Operational Definitions

Effectiveness

It refers to the statistically significant change in the diabetic wound status of patients in experimental group after the Honey Dressing for a period of 3 weeks, which is assessed by Bates-Jensen Wound Assessment Tool.

Honey dressing

It refers to the clean dressing procedure of cleansing the wound with normal saline, filling ¾th depth of the wound with honey, placing a honey spreaded gauze pad over the wound and covering the wound with gauze bandage or plaster.

Diabetic wound status

It refers to the stature of the wound in terms of size, depth, edges, undermining, necrotic tissue type, necrotic tissue amount, exudate type, exudate amount, skin colour surrounding wound, peripheral tissue oedema, peripheral tissue

induration, granulation tissue and epithelialisation as measured by Bates-Jensen Wound Assessment Tool.

Patients

Persons those who are diagnosed as diabetic foot ulcer.

Diabetic foot ulcer

It refers to the wound occurred due to the complication of diabetes which may be superficial, full thickness or deep and located at any part of the foot.

Assumptions

- Diabetic foot ulcer may be healed with specific interventions.
- Diabetic foot ulcer may lead to complications if they are not adequately cared for.
- Honey may have an antibacterial effect on diabetic wound.

Hypotheses

H_1: There will be a significant difference in the diabetic wound status among patients with diabetic foot ulcer in the experimental and control group at $p<0.05$ level.

H_2: There will be a significant association of the diabetic wound status among patients with diabetic foot ulcer in experimental and control group with their selected demographic variables at $p<0.05$ level.

Delimitations

- The study period was limited to 4 weeks.
- The study was limited to patients with diabetes those who are diagnosed as diabetic foot ulcer.

Projected Outcome

This study would evaluate the effectiveness of honey in management of diabetic foot ulcer in diabetic patients. Findings of this study would help to practice the honey dressing to promote wound healing effectively.

Conceptual Framework Based on Pender's Health Promotion Model

The conceptual framework selected for the present study was based on Pender's health promotion model. The initial version of the health promotion model appeared in 1980s and later in 2006, it was refined. The health promotion model is a competence or approach oriented model in which the motivational source for behaviour change is based on the individual's subjective value of the change- that is, how the client perceives the benefits of changing the given health behaviour.

Variables

Individual characteristics and experiences

Personal factors are categorised as biological, psychological and socio-cultural. Some personal factors can influence health behaviours whereas others, such as age, cannot be changed. Prior related behaviour includes previous experience, knowledge and skill in health promoting actions.

Behaviour specific cognitions and affect

It constitutes a critical "core" for intervention because they can be modified through nursing interventions. They include the following:

- **Perceived benefits of action**
  - Anticipated benefits or outcomes affect person's plan to participate in health promoting behaviours and may facilitate continued practice.

- **Perceived barriers to action**
  - Perceived barriers to action affect health promoting behaviours by decreasing the individual's commitment to a plan of action.
- **Perceived self-efficacy**
  - It refers to the conviction that a person can successfully carry out the behaviour necessary to achieve a desired outcome.
- **Activity- related affect**
  - The subjective feelings that occur before, during, and following an activity can influence whether a person will repeat the behaviour again or maintain the behaviour.
- **Interpersonal influences**
  - They are a person's perceptions concerning the behaviours, beliefs or attitudes of others.
- **Situational influences**
  - They include perceptions of available options, demand characteristics, and the aesthetic features of the environment.

Commitment to a plan of action

It involves two processes: commitment and identifying strategies for carrying out and reinforcing the behaviour.

Immediate competing demands and preferences

Competing demands are those behaviours over which an individual has a low level of control. Competing preferences are behaviours over which an individual has a high level of control.

Behavioural outcome

It is directed toward attaining positive health behaviours.

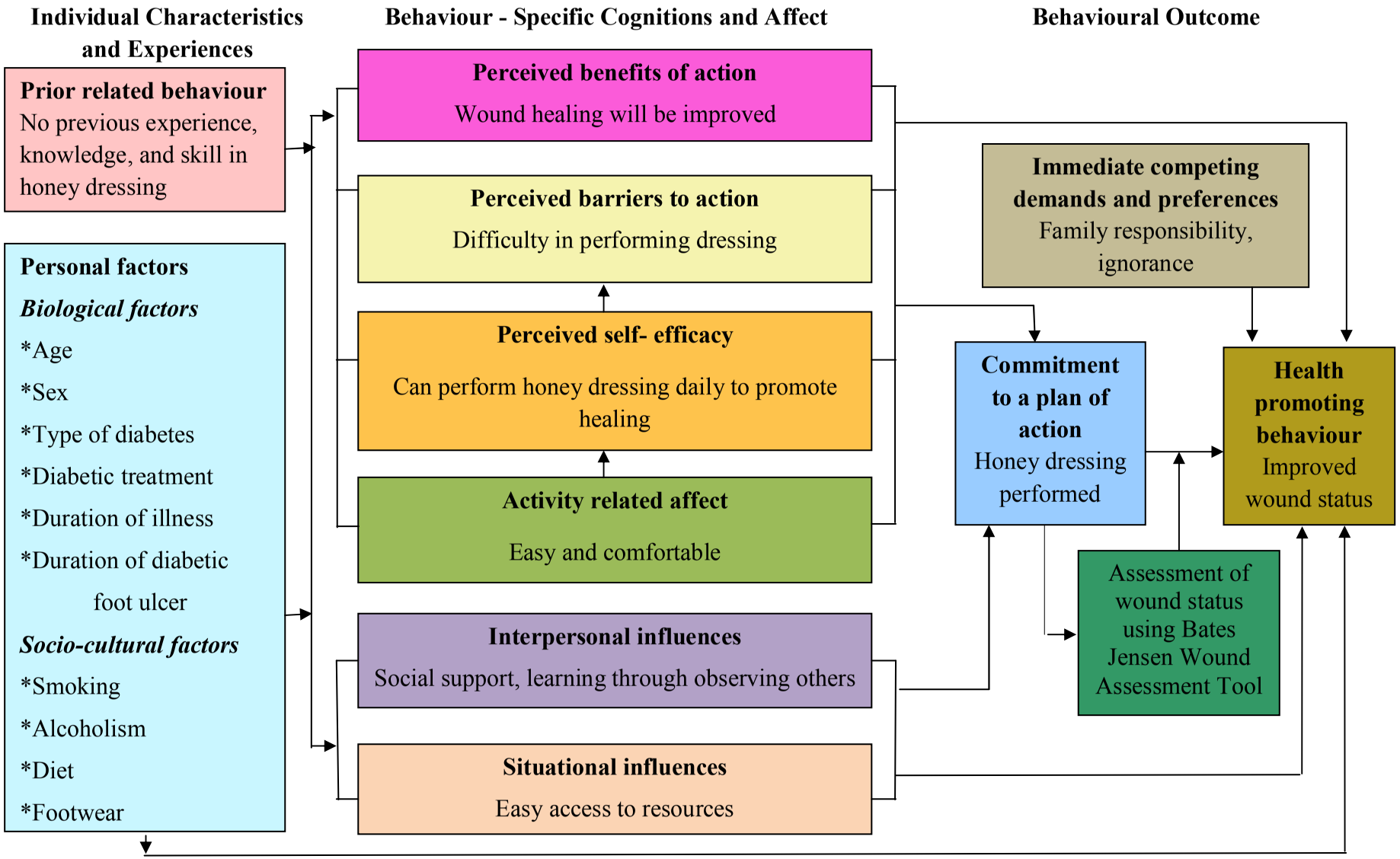


Figure- 1.1: Conceptual Framework Based on Pender's Health Promotion Model

Summary

This chapter dealt with introduction, need for the study, statement of the problem, objectives, operational definitions, assumptions, hypotheses, delimitations, projected outcome and conceptual framework.

CHAPTER - II

REVIEW OF LITERATURE

This chapter presents a review of selected literature relevant to the present study. Review of literature is an important step in the development of the research project, and in broadening the understanding and developing an insight into the problem area. It further helps in developing the broad conceptual context, in which the problem fits. The review of literature is presented in the following sections:

Section I : Literature related to diabetic foot

Section II : Literature related to honey on wound healing

Literature Related to Diabetic Foot

Marjolein, et. al., (2009), studied the association between the history of diabetic foot ulcer, perceived health and psychological distress. This study included diabetic persons with diabetic foot ulcer and without diabetic foot ulcer. It was found that perceived health and psychological well-being were significantly poorer among participants with diabetes and a history of foot ulcer compared to those without diabetes. Among people with diabetes, a history of foot ulcer had a significant negative impact on perceived health but did not independently contribute to psychological distress.

Viswanathan, (2007), said that the prevalence of diabetic wound infection was 6-11% and amputation was 3% in type II diabetic patients and the prevalence of diabetic foot ulcers in population attending clinics was 3.6% in India.

Boyko, et. al., (2007), conducted a prospective study of risk factors for diabetic foot ulcer and studied the effects of diabetes characteristics, foot deformity, behavioural factors, and neurovascular function on foot ulcer risk among 749 diabetic veterans with 1,483 lower limbs. Baseline assessment included history, lower-limb

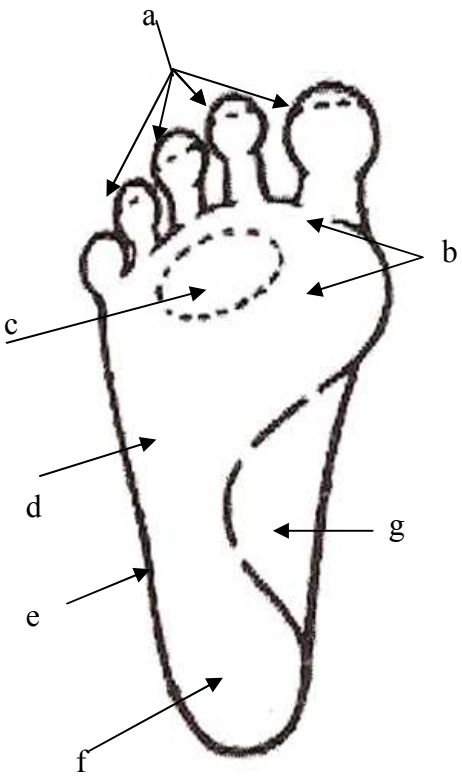
physical examination, tests for sensory and autonomic neuropathy, and measurements of macro- and micro-vascular perfusion in the foot. Subjects were followed for the occurrence of a full thickness skin defect on the foot that took greater than 14 days to heal, with a mean follow-up of 3.7 years and found out that certain foot deformities, reduced skin oxygenation and foot perfusion, poor vision, greater body mass, and both sensory and autonomic neuropathy independently influence foot ulcer risk, thereby providing support for a multi-factorial aetiology for diabetic foot ulceration.

Keh, et. al., (2003), conducted studies on diabetic foot ulcer in patients at JOS university teaching hospital, Nigeria. These epidemiological and microbiological studies of diabetic foot ulcer were carried with a view to reduce amputation and mortality rate associated with the disease. Results showed a very high rate of amputation and mortality. A multi-disciplinary approach to the management of diabetic foot ulcer was advocated. Efforts were made to carry out cultures of patients from refractory ulcers to rule out yeast colonization which if not treated will delay wound healing.

Reiber, & Colleagues, (2003), found out that the prevalence of Diabetic Foot Ulcer during the lifetime of a patient with diabetes is 15% - 20%.

Abbott, et. al., (2002), says that within a given year, the incidence of patients with diabetes who develop foot ulcers ranges from 1.9% - 2.6%.

India's 1st Multinational Study Group Meeting on 'Diabetic Foot and Wound Healing' found that socio-cultural practices such as barefoot walking, religious practices like walking on fire, use of improper footwear and lack of knowledge regarding foot-care attributes towards increase in the prevalence of foot complications in India.



a) Tip of toes <5%

b) Big toe region 30-50%

c) Central toe region: 2^{nd}-5^{th} metatarsal heads 20-30%

d) Metatarsal head region 15-20%

e) Mid lateral border of the foot (base of the 5^{th} metatarsal) 15-20%

f) Heel 5-10%

g) Instep <1% **(Richard Shwarz & Wim Brandsma).**

Figure: 2.1- Frequency of Distribution of Ulcers in Sole of the Foot

Literature Related to Honey on Wound Healing

Makhdoom, A. et. al., (2009), conducted a study on Management of diabetic foot by natural honey with the aim of topical wound dressings in diabetic wounds with natural honey. They observed excellent results in treating diabetic wounds with dressings soaked with natural honey. The disability of the diabetic foot patients was minimized by decreasing the rate of leg or foot amputations and thus enhancing the quality and productivity of individual life.

Johnson, D. W. et. al., (2009), conducted the honeypot study protocol: a randomized controlled trial of exit-site application of medihoney antibacterial wound gel for the prevention of catheter-associated infections in peritoneal dialysis patients. The primary objective of this study was to determine whether daily exit-site application of standardized antibacterial honey results in less catheter-associated infections compared with standard topical mupirocin prophylaxis of nasal

staphylococcal carriers. 370 subjects were randomized 1:1 to receive either daily topical exit-site application of Medihoney, Antibacterial Wound Gel. The study continued until 12 months. Demonstration of a significant improvement in PD catheter-associated infections with topical Medihoney provided clinicians with an important new prophylactic strategy with a low propensity for promoting antimicrobial resistance.

Maeda, Y. et. al., (2008), conducted a study on the antibacterial activity of honey against community-associated methicillin-resistant Staphylococcus aureus (CA-MRSA). Results demonstrated that honey was able to reduce the cultural count of all CA-MRSA from approximately 10(6) colony-forming units (cfus) (mean = 6.46 log10 cfu/g) to none detectable within 24 hours of co-culture of separate CA-MRSA organisms. Subsequent non-selective enrichment of honey demonstrated that inoculated honey remained positive for CA-MRSA until 72 hours of post-inoculation, after which point no culturable organisms could be detected. This study demonstrated that, this natural product, honey had an anti-microbial activity against the CA-MRSA organisms tested.

Eddy, J. J., et. al, (2008), suggest that there are various methods of wound dressing using honey and the investigator identified the spreading of honey on the dressing pad rather than on the wound. This type of dressing is much easier to do and is less traumatic for the patient. It also gives a more even coverage of the wound surface, where deep wounds or abscesses need to be filled with honey

Eddy, J. J., et. al., (2008), reviewed the practical considerations of using topical honey for neuropathic diabetic foot ulcers to familiarize physicians with practical aspects of using honey to treat diabetic foot ulcers. In this review, the authors summarized the evidences of honey's effectiveness, its hypothesized mechanism of

action, benefits, the types of honey available for dressing, and the nature of its application. Critical aspects of ulcer care were also reviewed and concluded that honey is a low-cost topical therapy with important potential for healing.

Abdelatif, M., et. al., (2008), conducted a prospective pilot study on safety and efficacy of a new honey ointment on diabetic foot ulcers. The objective was to study the effectiveness and safety of pedyphar ointment, a new ointment prepared from natural royal jelly and panthenol in an ointment base in the treating patients with limb-threatening diabetic foot infections. They found out that 96% of the patients responded well, with a complete cure, defined as 'complete closure of the ulcer without signs of underlying bone infection' and concluded that pedyphar ointment is a promising, safe conservative local treatment.

Shukrimi, A., et. al., (2008), conducted a comparative study between honey and povidone iodine as dressing solution for Wagner type II diabetic foot ulcers**.** There were 30 patients between 31 to 65 years of age (mean of 52.1 years). The mean healing time in the povidone dressing group was 15.4 days (range 9-36 days) compared to 14.4 days (range 7-26 days) in the honey group ($p < 0.005$). In conclusion, honey dressing is a safe alternative dressing for Wagner grade-II diabetic foot ulcers.

Jull, A. B., et. al., (2008), studied honey as a topical treatment for burn wounds. The objective of the study was to determine whether honey increases the rate of healing in acute wounds. It was concluded that honey improves healing times in mild to moderate superficial and partial thickness burns compared to other conventional dressings.

Subrahmanyam, M., (2007), carried out another prospective randomised clinical study to compare honey-impregnated gauze with amniotic membrane dressing

for partial thickness burns. 40 patients were treated with honey-impregnated gauze and 24 were treated with amniotic membrane dressing. The burns treated with honey healed earlier compared with the other (mean 9.4 versus 17.5 days: $p < 0.001$). Residual scars were noted in 8% of patients treated with honey-impregnated gauze and in 16.6% of cases treated with amniotic membrane ($p<0.001$).

Mullai, V., & Menon, T., (2007), studied the bactericidal activity of different types of honey against clinical and environmental isolates of Pseudomonas aeruginosa. In this study, they have assessed the antibacterial activity of different types of honey (manuka honey from Australia, heather honey from the United Kingdom, and locally marketed Indian honey). The locally available (khadikraft) honey has increased activity against the organism, Pseudomonas aeruginosa and was found to be better than all of the imported varieties of therapeutic honey.

Efem, S. E. E., (2005), has done a study with honey dressings of 59 patients with recalcitrant wounds and ulcers, 47 of them had been treated for a "sufficiently long time" (1 month to 2 years) with conventional treatment with no healing, or no reduction in size. The wounds were of different types, such as Fournier's gangrene, burns, cancrum oris and diabetic ulcers, traumatic ulcers, decubitus ulcers, sickle cell ulcers and tropical ulcers. 59 cases showed remarkable improvement following topical application of honey. Other benefits were that sloughs, necrotic and gangrenous tissue separated so that they could be lifted off painlessly, within 2-4 days in Fournier's gangrene, cancrum oris and decubitus ulcers and were rapidly replaced with granulation tissue and advancing epithelialisation.

Subrahmanyam, M., (2005), found out in one of his studies with a case of below knee amputation in a young boy, which was heavily infected with Pseudomonas and Staphylococcus aureus and non responsive to conventional

treatment, that application of sterilized active Manuka honey dressing pads led to complete healing in 10 weeks. He concluded that honey dressing speeds up healing process, sterilizes wound, reduces pain with enhanced formation of granulation tissue, lessens inflammation and scarring, have an advantage of easy dressing change and is a low cost therapy.

Osuagwu, et. al., (2004), said that honey has also shown anti-mycobacterial effect. Growth of mycobacterium was inhibited at honey concentrations of 10% and 20%. The uses of honey found are rapid clearance of infection, inflammation, swelling and quick reduction of pain and odour induced sloughing of necrotic tissue, hastened granulation and epithelialisation, and rapid healing occurs with minimal scarring. Honey causes no tissue damage like the other topical antiseptics. It is also known for enhancing wound contraction in fresh wounds which is one of the key features of wound healing.

Stephen, & Haynes, J., (2004), conducted a study on evaluation of honey-impregnated tulle dressing in primary care. The healing properties of honey include stimulating new tissue growth, moist wound healing, fluid handling and promoting epithelialization. Until recently, honey was not developed as a wound management product and not certified as a pharmaceutical device. a sterile, non-adherent dressing impregnated with Leptospermum scoparium hone.was prepared and it is called as Activon Tulle. The healing properties of honey dressings would make this a valuable addition to the dressing currently available in the primary care setting.

Blair, (2003), has revealed that honey is powerful even against drug-resistant hospital killer golden Staphylococcus aureus. Honey provides a moist healing environment that allows skin cells to re-grow across a healing wound flush with the surface of the wound and prevents bacterial growth even when wounds are heavily

infected. It renders heavily infected wounds sterile and inhibits the growth of antibiotic resistant strains of bacteria. Viscosity of honey acts as a barrier against wound infection. It provides glucose to leucocytes, which helps in respiratory burst to produce hydrogen peroxide and thus leads to the antibacterial activity of macrophages. The antibacterial activity is also stimulated by the acidity of honey.

Weyden, E. A., (2003), studied the use of honey for the treatment of patients with pressure ulcers. The use of honey resulted in a rapid and complete healing of the wounds. In addition, the antibacterial activity of honey had a deodorizing effect on the wounds and its anti-inflammatory actions helped to reduce the level of pain and as a result honey alginates are now being used as the 'standard' treatment for chronic wounds.

Lusby, et. al., (2002), has indicated that honey may have anti-inflammatory activities which stimulate the immune responses within a wound. Honey has been shown to stimulate the monocytes to produce inflammatory cytokines. Cytokines are secreted by immune cells in response to pathogens, and signals the immune cells to increase their response to pathogens.

Subrahmanyam, M., (2002), conducted a prospective randomized controlled trial in which honey was compared with boiled potato peel as a cover for fresh partial-thickness burns. Of the 40 patients treated with honey who has had positive swab cultures at the time of admission, 90% had their wounds rendered sterile within 7 days. All of the 42 patients treated with boiled potato peel dressings who has had positive swab cultures at the time of admission had persistent infection after 7 days. Of the wounds treated with honey, 100% healed within 15 days compared with 50% of the wounds treated with boiled potato peel dressings. The mean times to heal, 10.4

days with honey versus 16.2 days with boiled potato peel, were significantly different ($p<0.001$).

In a prospective randomised controlled trial, honey was compared with silver sulfadiazine-impregnated gauze for efficacy as a dressing for superficial burn injury. It was carried out with a total of 104 patients. In the 52 patients treated with honey, 91% of the wounds were rendered sterile within 7 days. In the 52 patients treated with silver sulfadiazine, 7% showed control of infection within 7 days. Patients treated with honey had healthy granulation tissue earlier (means 7.4 versus 13.4 days). The honey-treated group took less time for healing ($p<0.001$). 87% healed within 15 days compared with 10% of those treated with silver sulfadiazine. Less pain, exudation, irritation of the wound, and hypertrophic scar and post-burn contracture were noted with the honey treatment. The honey treatment accelerated the epithelialisation, a chemical debridement effect and removal of offensive smell at 6-9 days.

Hejase, M. J., et. al., (2001), worked on genital Fournier's gangrene: experience with 38 patients. All the patients underwent application of unprocessed honey dressings and the study showed that topical application of unprocessed honey is beneficial to the healing process.

Vardi, A., et. al., (2001), evaluated the effectiveness of Local application of honey for treatment of neonatal postoperative wound infection. The study included 9 infants with large, open, infected surgical wounds that failed to heal with conventional treatment of at least 14 days of intravenous antibiotic and cleaning the wound with aqueous chlorhexidine solution (0.05% w/v) and fusidic acid ointment. These wounds were still open with oozing pus, and swab cultures were positive. Marked clinical improvement was seen in all infants after 5 days of treatment with topical application

of 5 - 10 ml of honey twice daily. The wounds became closed, clean and sterile in all infants after 21 days of application of honey.

Subrahmanyam, M., (2000), conducted another prospective randomised clinical and histological study of superficial burn wound healing with honey and silver sulfadiazine. In this trial, honey was compared with silver sulfadiazine-impregnated gauze on comparable fresh partial thickness burns, histological examination of biopsy patients from the wound margin as well as clinical observations of wound healing were made to assess relative effects on wound healing in 2 groups of 25 patients. Group treated with honey took significantly shorter time for healing ($p<0.001$). Of the wounds treated with honey, 84% showed satisfactory epithelialisation by the 7^{th} day, 100% by the 21^{st} day. In wounds treated with silver sulfadiazine, epithelialisation occurred by the 7^{th} day in 72% of the patients and in 84% of patients by 21 days. Histological evidence of repairing activity was seen in 80% of wounds treated with the honey dressing by the 7^{th} day, with minimal inflammation. Of the wounds treated with silver sulfadiazine, 52% showed reparative activity, with inflammatory changes, by the 7^{th} day. Reparative activity reached 100% by 21 days with the honey dressing and 84% with silver sulfadiazine. wounds dressed with honey showed early subsidence of acute inflammatory changes, better control of infection and quicker wound healing, while wounds treated with silver sulfadiazine sustained inflammatory reaction and was even noted on epithelialisation. No skin grafting was required for the wounds treated with honey, but 4 of the wounds treated with silver sulfadiazine converted to deep thickness burn and required skin grafts.

Efem, S. E. E., (2000), conducted preliminary observations on recent advances in the management of Fournier's gangrene. 20 consecutive cases of Fournier's gangrene managed conservatively with systemic antibiotics (oral

amoxicillin/ clavulanic acid and metronidazole) in addition to daily topical application of honey were compared with 21 similar cases of Fournier's gangrene managed by the orthodox method like wound debridement, wound excision, secondary suturing, receiving a mixture of systemic antibiotics dictated by sensitivity results from cultures. 3 deaths occurred in the group treated by the orthodox method, whereas no deaths occurred in the group treated with honey. The anaesthesia need and expensive surgical operation was reduced with the use of honey. Response to treatment and lessening of morbidity were faster in the honey treated group. The wounds became sterile within 1 week.

Stacey, (2000), found that wound dressings with impregnated honey are available nowadays. A lot of commercial preparation with honey and medihoney plays an important role in wound healing in the present days. But they too are very expensive for an average Indian who is struggling with diabetic wound

Summary

This chapter dealt with the review of literature related to diabetic foot and honey on wound healing.

CHAPTER- III

METHODOLOGY

This chapter deals with a brief description of methodology which was undertaken by the investigator for the research study.

Research Approach

Quantitative evaluative approach was used in this study.

Research Design

Quasi experimental research (Non equivalent control group pre-test post test) design was used in this study.

E : O_1 X O_2

C : O_1 O_2

E : Experimental group

C : Control group

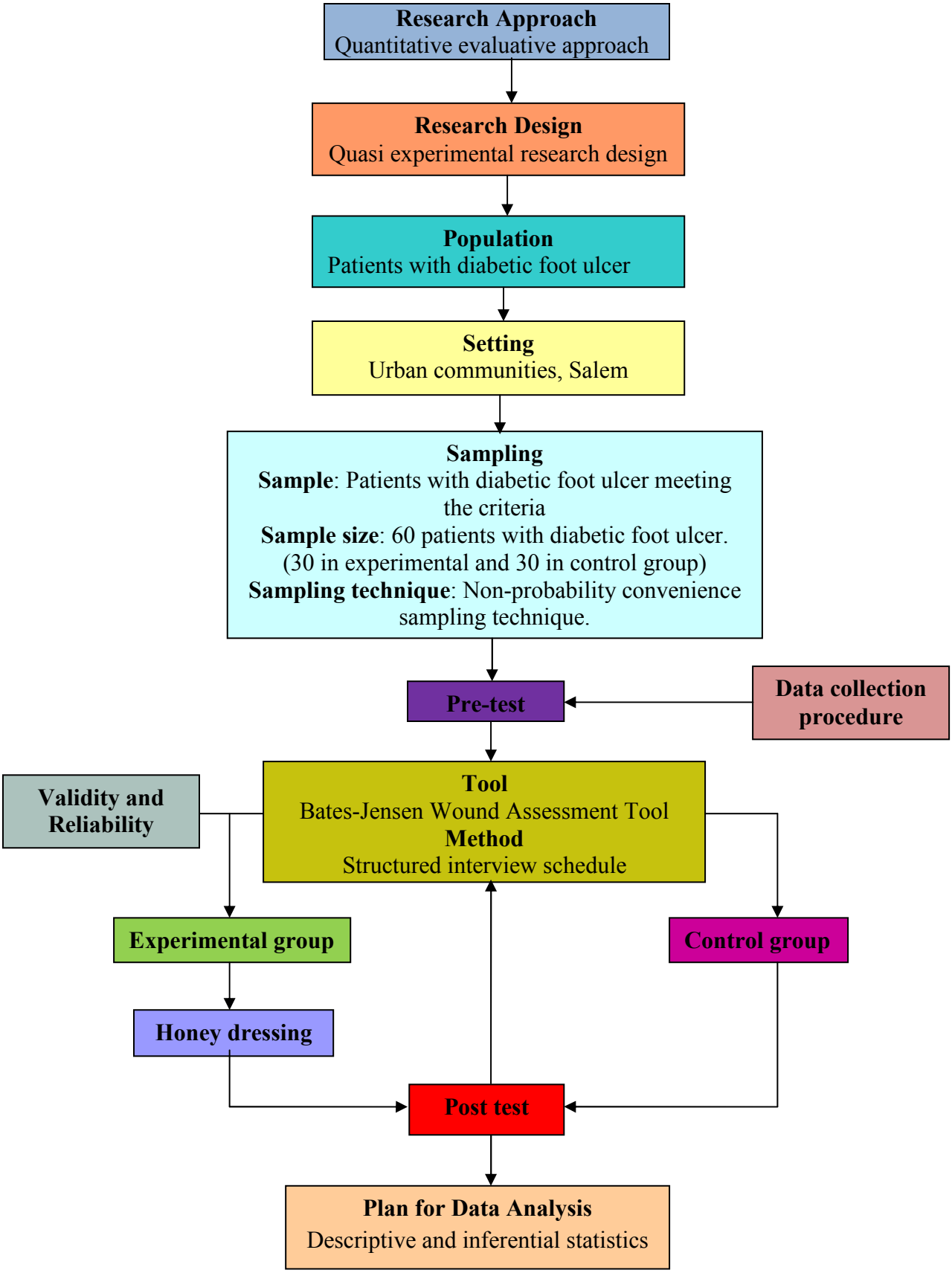
O_1 : Pre test on diabetic wound status

X : Honey dressing

O_2 : Post test on diabetic wound status

Population

The population of this study includes the patients with diabetic foot ulcer. The number of patients with diabetic foot ulcer treated in M. G. Diabetic Centre per month is about 70-80.



Figure– 3.1: Schematic Representation of Research Methodology

Description of the Setting

The study was conducted in the urban communities of Salem. The urban communities were selected as per the addresses of the patients collected from M.G. Diabetic Centre, Alagapuram, Salem. These selected urban communities were located around 15 kilometres away from Sri Gokulam College of Nursing, Salem and they were Alagapuram, Fairlands, Hasthampatty, Kannankurichi, ITI, Chinnathirupathy, Gorimedu, Adivaaram, Karipatty, Ayothiapattanam, Varagampady, State Bank Colony, Kuranguchavadi, Junction and Ariyaagoundampatty.

Sampling

- **Sample**

  Patients with diabetic foot ulcer in urban communities, Salem fulfilling the criteria.

- **Sample size**

  60 patients with diabetic foot ulcer (30 in experimental group and 30 in control group).

- **Sampling technique**

  The investigator used non-probability convenience sampling technique.

- **Criteria for sample selection**

  The sample selection was based on the following inclusion and exclusion criteria.

  Inclusion criteria

  - Patients of all types of diabetes mellitus with superficial, full-thickness and deep diabetic foot ulcer.
  - Patients who are willing to participate in the study.
  - Patients who are between 30-65 years of age.
  - Patients who are treated in M. G. Diabetic Centre.

Exclusion criteria

- Patients who are critically ill.
- Patients with localised gangrene and gangrene of the entire foot.
- Patients under immunosuppressive drugs, radiation therapy and corticosteroids.

Variables

- **Independent variable:** Administration of honey dressing.
- **Dependent variable :** Diabetic Wound status.

Description of the Tool

The tool was prepared by the investigator after extensive study of the related literature and with the guidance of experts. The tool consists of two sections.

Section- A

This section deals with the demographic variables. 17 demographic variables were collected using Structured Interview Schedule. They were age, sex, educational status, occupation, type of diabetes mellitus, whether on anti-diabetic treatment, duration of illness, habit of smoking, if yes duration of smoking, habit of alcoholism, if yes duration of alcoholism, dietary pattern, whether on diabetic diet, habit of wearing footwear, if yes type of footwear, and if special chappals its type. No score was allotted, but the data of this section was used for descriptive analysis.

Section- B

This section deals with the assessment of the diabetic wound status using Bates-Jensen Wound Assessment Tool. It consists of 13 items related to various aspects of wound like size, depth, edges, undermining, necrotic tissue type, necrotic tissue amount, exudate type, exudate amount, skin colour surrounding wound,

peripheral tissue oedema, peripheral tissue induration, granulation tissue and epithelialisation.

Scoring procedure

Each item had a score from 1-5 depending on the severity of the wound. The minimum and maximum possible score was 13 and 65 respectively. The score interpretation of the wound status was done as follows:

Table - 3.1: Score interpretation of diabetic wound status

Score	Diabetic wound status
1-22	Mildly unhealthy
23-44	Moderately unhealthy
45-65	Severely unhealthy

Validity and Reliability

Content validity of the tool was established in consultation with 10 experts from different fields like Community health nursing, Medical and Surgical nursing and Medicine. Minor modifications given by the experts were incorporated in the demographic variables.

According to **Carrie Sussman and Barbara M. Bates Jensen**, "Wound care: a collaborative practice manual", the mean inter-rater reliability co-efficient was r^1=0.91 and the mean intra-rater reliability co-efficient was r^1=0.975.

Pilot Study

The pilot study was conducted from 07.06.2010 to 12.06.2010 in urban communities of Salem. It was conducted after the tool presentation and approval by the college of nursing faculty and dissertation committee. Validity and reliability of the instrument were tested during this time. 6 patients with diabetic foot ulcer were

selected through non-probability convenience sampling technique. The tools were administered and checked for its feasibility, language and appropriateness. The patients chosen were similar in characteristics to those of the population under study. The tool was found feasible and practicable. It also helped to select the suitable statistical method.

Method of Data Collection

Ethical considerations

Prior to collection of data, written permission was obtained from Dr. M. G. Uvaraj, M. D., Managing Director of M. G. Diabetic Centre, Alagapuram, Salem.

Informed consent was obtained from all the 60 patients with diabetic foot ulcer.

Period of data collection

The study was conducted in urban communities of Salem from 05.07.2010 to 31.07.2010.

Data Collection Procedure

The M. G. diabetic centre, Alagapuram, Salem, was selected. 60 patients who fulfilled the criteria were selected from the diabetic centre by convenience sampling technique and their addresses were collected from the hospital records and 30 patients were assigned to experimental group and 30 patients were assigned to control group. The general information was collected through the structured interview schedule and the diabetic wound status was assessed using the Bates-Jensen Wound Assessment Tool among both the experimental and control groups. After the pre-test, the honey dressing was demonstrated to the 30 patients in the experimental group. Return demonstration was seen on the next day using a checklist. All the 30 patients were

provided with the dressing materials like gauze pieces, bandage rolls, adhesive plasters, gauze pads, honey and normal saline and also with a daily record sheet of wound dressing which includes the date and time of dressing, reason if dressing not done and signature of the primary caregiver. They were asked to perform the dressing procedure daily and to maintain it in the daily record sheet daily. Frequent visits were made to the patients' houses to make sure that the honey dressing was done correctly. No intervention was provided for the control group and they were following their previous treatment. Post test was done after 21 days to assess the diabetic wound status of both experimental and control group.

Plan for Data Analysis

Data will be collected, arranged and tabulated. Descriptive statistics like frequency, percentage, mean and standard deviation will be used for categorical data. Inferential statistics, independent 't' test will be used to find the effectiveness of honey dressing on diabetic wound status and chi-square test will be to associate the diabetic wound status with their selected demographic variables.

Summary

This chapter included the research approach, research design, population, description of the setting, sampling, variables, description of the tool, validity and reliability, pilot study, method of data collection, and plan for data analysis.

CHAPTER- IV

DATA ANALYSIS AND INTERPRETATION

This chapter presents the quantitative results of the study attempted to evaluate the effectiveness of honey dressing on wound status among patients with diabetic foot ulcer was done in urban communities of Salem. This chapter presents the details of the data analysed and the findings under the following sections;

Section- A: Distribution of patients according to their selected demographic variables in experimental and control group.

Section- B : a) Distribution of patients according to their pre-test level of diabetic wound status in experimental and control group.

b) Distribution of patients according to their post test level of diabetic wound status in experimental and control group.

Section- C : a) Comparison of patients according to their pre-test and post test level of wound status in experimental and control group.

b) Comparison of mean, standard deviation and mean difference of diabetic wound status among patients in experimental and control group.

Section- D : Hypotheses testing

a) Effectiveness of honey dressing on diabetic wound status among patients in experimental and control group.

b) Association of the diabetic wound status among patients in experimental and control group with their selected demographic variables.

Section- A

Distribution of Patients According to their Demographic Variables in Experimental and Control Group

Table- 4.1:

Frequency and percentage distribution of patients according to their biographic variables in experimental and control group

n=60

Sl. No.	Biographic Variables		Experimental Group (n=30)		Control Group (n=30)	
			f	%	f	%
1.	**Age**	30-39 years	-	-	-	-
		40-49 years	4	13.33	3	10
		50-59 years	7	23.33	9	30
		60 years and above	19	63.33	18	60
2.	**Sex**	Male	17	56.67	20	66.67
		Female	13	43.33	10	33.33
3.	**Educational status**	No formal education	5	16.67	6	20
		1^{st} -5^{th} standard	5	16.67	3	10
		6^{th} -12^{th} standard	9	30	14	46.67
		Graduate	11	36.67	7	23.33
4.	**Occupation**	Unemployed	6	20	8	26.67
		Private employee	8	26.67	12	40
		Government employee	4	13.33	2	6.67
		Business	7	23.33	5	16.67
		Retired	5	16.67	3	10

The above table shows that, in the experimental group, 19(63.33%) patients were in the age group of 60-65 years and 17(56.67%) were males; 11(36.67%) were graduates and 8(26.67%) were private employees.

In the control group, 18(66.67%) patients were in the age group of 60-65 years and 20(66.67%) were males; 14(46.67%) have studied up to 6th to 12th standard and 12(40%) were private employees.

Table- 4.2:

Frequency and percentage distribution of patients according to their personal variables in experimental and control group

n=60

Sl. No.	Personal Variables		Experimental Group (n=30)		Control Group (n=30)	
			f	%	f	%
1.	**Habit of smoking**	Yes	11	36.67	12	40
		No	19	63.33	18	60
2.	**If yes, duration of smoking**	Less than 1 year	-	-	-	-
		1-3 years	-	-	-	-
		4-6 years	-	-	-	-
		7-9 years	2	18.18	2	16.67
		Above 10 years	9	81.82	10	83.33
3.	**Habit of alcoholism**	Yes	7	23.33	10	33.33
		No	23	76.67	20	66.67
4.	**If yes, duration of alcoholism**	Less than 1 year	-	-	-	-
		1-3 years	-	-	-	-
		4-6 years	-	-	-	-
		7-9 years	1	14.29	2	20
		Above 10 years	6	85.71	8	80
5.	**Dietary pattern**	Vegetarian	8	26.67	5	16.67
		Non-vegetarian	22	73.33	25	83.33
6	**Habit of wearing foot wear**	Yes	27	90	26	86.67
		No	3	10	4	13.33
7.	**If yes, type of**	Slippers	17	62.96	14	53.85

	foot wear	Shoes	4	14.81	5	19.23
		Special chappals	6	22.22	7	26.92
8.	**If special chappals, its type**	MCR chappals	4	66.67	4	57.14
		Doctors chappals	2	33.33	2	28.57
		Acupressure chappals	-	-	1	14.29

The above table shows that, in the experimental group, 11(36.67%) patients had habit of smoking and 9(30%) among them had smoking for above 10 years; 7(23.33%) patients had the habit of alcoholism and 6(20%) among them, 7(23.33%) were alcoholic for more than 10 years; majority, i.e., 22(73.33%) of the patients were non-vegetarians and most of them, i.e., 27(90%) have the habit of wearing foot wear and 17(66.67%) among them wear slippers and 6(20%) among them wear special chappals, among them 4(13.33%) wear MCR chappals.

In the control group, 12(40%) patients had habit of smoking and 10(33.33%) among them had smoking habit for above 10 years; 10(33.33%) patients had the habit of alcoholism and 8(26.67%) among them were alcoholic for more than 10 years; majority of the patients, i.e., 25(83.33%) were non-vegetarians and majority, 26(86.67%) had the habit of wearing foot wear and 14(46.67%) among them wear slippers and 7(23.33%) among them wear special chappals, among them 4(13.33%) wear MCR chappals.

Table- 4.3:

Frequency and percentage distribution of patients according to their illness related variables in experimental and control group

n=60

Sl. No.	Illness related Variables		Experimental Group (n=30)		Control Group (n=30)	
			f	%	f	%
1.	**Type of Diabetes Mellitus**	Type I DM	1	3.33	-	-
		Type II DM	29	96.67	30	100
2.	**Whether on anti diabetic treatment**	Regular treatment	9	30	10	33.33
		Irregular treatment	19	63.33	19	63.33
		No treatment	2	6.67	1	3.33
3.	**Duration of illness**	Less than 1 year	-	-	-	-
		1-3 years	2	6.67	1	3.33
		4-6 years	4	13.33	2	6.67
		7-9 years	5	16.67	3	10
		Above 10 years	19	63.33	24	80
4.	**Duration of diabetic foot ulcer**	Less than 1 year	25	83.33	27	90
		1-3 years	3	10	2	6.67
		4-6 years	2	6.67	1	3.33
		7-9 years	-	-	-	-
		Above 10 years	-	-	-	-
5.	**Whether on diabetic diet**	Regular diabetic diet	9	30	8	26.67
		Irregular diabetic diet	18	60	21	70
		No	3	10	1	3.33

The above table shows that in the experimental group, almost all, i.e., 29(96.67%) of the patients were of type II diabetes and 19(63.33%) were on irregular anti-diabetic treatment; 19(63.33%) of the patients had diabetes for more than 10 years and majority

i.e., 25(83.33%) of them had diabetic foot ulcer for less than 1 year; 18(60%) were on irregular diabetic diet.

In the control group, all 30(100%) of the patients were of type II diabetes and 19(63.33%) were on irregular anti-diabetic treatment; majority, i.e., 24(80%) of the patients had diabetes for more than 10 years and almost all, i.e., 27(90%) of them had diabetic foot ulcer for less than 1 year; 21(70%) were on irregular diabetic diet.

Section- B

Distribution of Patients According to their Pre-test Level of Diabetic Wound Status in Experimental and Control Group

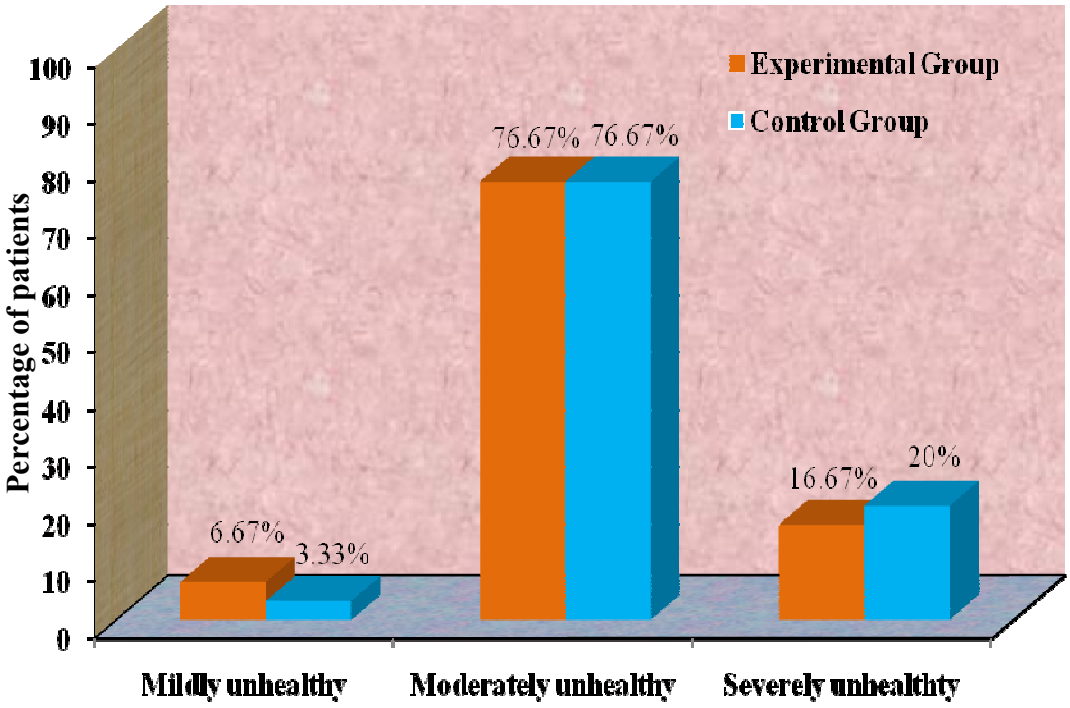


Figure- 4.1: Percentage distribution of patients according to their pre-test level of diabetic wound status in experimental and control group

The above figure shows that, in the experimental group, 2(6.67%) patients had mildly unhealthy wound status, majority, i.e., 23(76.67%) of them had moderately unhealthy wound status and 5(16.67%) had severely unhealthy wound status in pre-test. In the control group, 1(3.33%) patient had mildly unhealthy wound status, majority, i.e., 23(76.67%) of them had moderately unhealthy wound status and 6(20%) had severely unhealthy wound status in pre- test.

Distribution of Patients According to their Post-test Level of Diabetic Wound Status in Experimental and Control Group

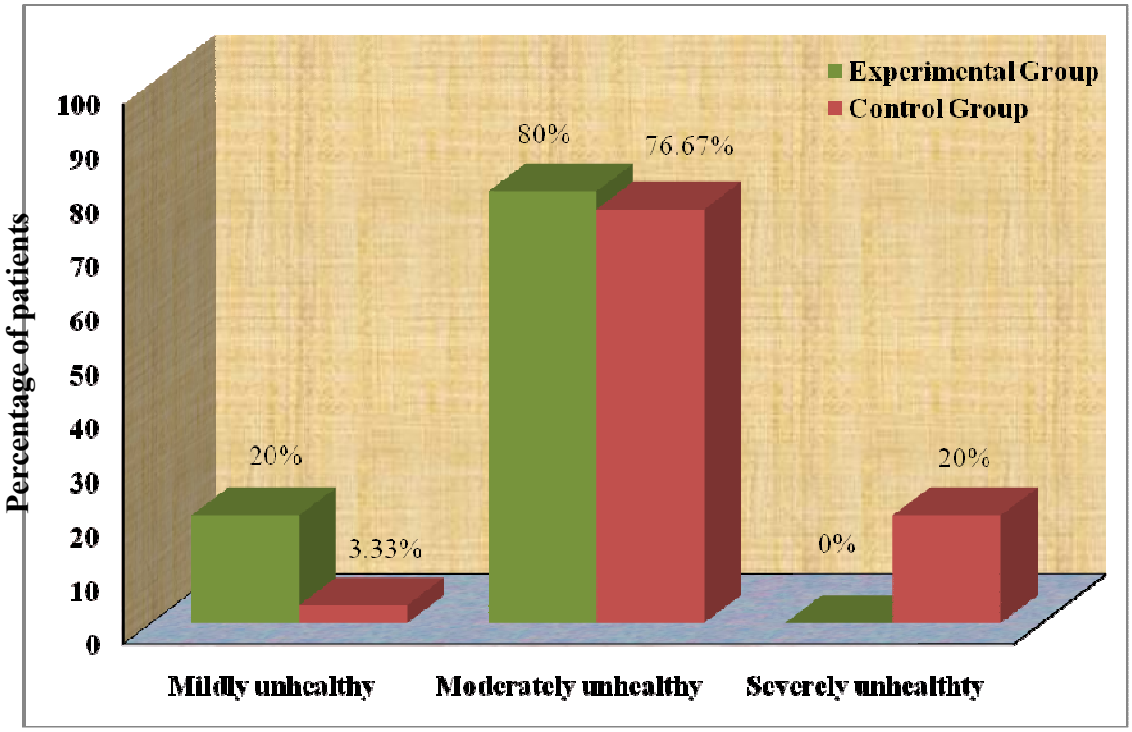


Figure- 4.2: Percentage distribution of patients according to their post test level of diabetic wound status in experimental and control group

The above figure shows that, in the experimental group, 6(20%) patients had mildly unhealthy wound status, majority, i.e., 24(80%) of them had moderately unhealthy wound status and none had severely unhealthy wound status in post test. In the control group, 1(3.33%) patient had mildly unhealthy wound status, majority, i.e., 23(76.67%) of them had moderately unhealthy wound status and 6(20%) had severely unhealthy wound status in their post test.

Section- C

Comparison of patients according to their pre-test and post test level of wound status in experimental and control group

Table- 4.4:

Percentage distribution of patients according to their pre-test and post test level of diabetic wound status in experimental and control group

n=60

Sl. No.	Level of diabetic wound status	Experimental group (n=30)				Control group (n=30)			
		Pre-test		Post test		Pre-test		Post test	
		F	%	f	%	f	%	f	%
1.	**Mildly unhealthy**	2	6.67	6	20	1	3.33	1	3.33
2.	**Moderately unhealthy**	23	76.67	24	80	23	76.67	23	76.67
3.	**Severely unhealthy**	5	16.67	-	-	6	20	6	20

The above table shows that, in the experimental group, 2(6.67%) patients had mildly unhealthy wound status, majority, i.e., 23(76.67%) of them had moderately unhealthy wound status and 5(16.67%) had severely unhealthy wound status during pre-test. In the control group, 1(3.33%) patient had mildly unhealthy wound status, majority, i.e., 23(76.67%) of them had moderately unhealthy wound status and 6(20%) had severely unhealthy wound status during their pre-test.

In the experimental group, 6(320%) patients had mildly unhealthy wound status, majority, i.e., 24(80%) of them had moderately unhealthy wound status and none had severely unhealthy wound status during post test. In the control group, 1(3.33%) patient had mildly unhealthy wound status, majority, i.e., 23(76.67%) of them had moderately unhealthy wound status and 6(20%) had severely unhealthy wound status during post test.

Comparison of mean, standard deviation and mean difference of diabetic wound status among patients with diabetic foot ulcer in experimental and control group

Table- 4.5:

Maximum score, mean, standard deviation and mean difference of diabetic wound status in experimental group and control group

n=60

Sl. No.	Group	Maximum Score	Pre-test		Post-test		Mean Difference
			Mean	S.D.	Mean	S.D.	
1.	**Experimental group**	65	35	8.63	29.13	7.73	5.87
2.	**Control group**		36.43	8.46	33.77	5.35	2.66

The above table shows that in the experimental group, the pre-test and post test mean score of diabetic wound status was 35 ± 8.63 and 29.13 ± 7.73 respectively. In the control group, the pre-test and post-test mean score was 36.43 ± 8.46 and 33.77 ± 5.35 respectively. The mean difference of diabetic wound status in the experimental and control group was 5.87 and 2.66 respectively. Thus it became evident that there was a difference in the diabetic wound status in experimental and control group.

Section- D

Hypotheses Testing

Effectiveness of honey dressing on diabetic wound status among patients with diabetic foot ulcer in experimental group and control group

Table- 4.6:

Maximum score, mean, standard deviation and 't' value of the of post test diabetic wound status among patients with diabetic foot ulcer in experimental group and control group

n=60

Sl. No.	Group	Maximum Score	Post-test		't' value
			Mean	S.D.	
1.	**Experimental group**	65	29.13	7.73	2.28*
2.	**Control group**		33.77	5.35	

* significant ($p<0.05$)

The above table shows that in the experimental group, the post test mean score of diabetic wound status was 29.13 ± 7.73 and in the control group, the post test mean score was 33.77 ± 5.35. The 't' value was 2.28 which shows that honey was effective in improving the diabetic wound status of patients with diabetic foot ulcer in experimental group at $p< 0.05$ level. Hence the formulated research hypothesis H_1 was retained.

Association of the diabetic wound status of patients with diabetic foot ulcer with their selected demographic variables in the experimental and control group

Table- 4.7:

Chi-square test on diabetic wound status with their selected biographic variables in the experimental and control group

n=60

Sl. No.	Biographic Variables	Experimental group		Control group	
		df	χ^2	df	χ^2
1.	**Age**	4	3.378	4	15.65*
2.	**Sex**	2	1.334	2	0.522
3.	**Education**	6	2.581	6	3.424
4.	**Occupation**	8	14.126	8	15.63*

* significant ($p<0.05$)

The above table shows that, in the experimental group, there was no significant association of the diabetic wound status with their selected biographic variables. Hence the formulated research hypothesis H_2 was rejected.

In the control group, there was a significant association of the diabetic wound status with their selected biographic variables like age and occupation at $p< 0.05$ level. Hence the formulated research hypothesis H_2 was retained to biographic variables like age and occupation only.

Table- 4.8:

Chi-square test on diabetic wound status with their selected personal variables in the experimental and control group

n=60

Sl. No.	Personal Variables	Experimental group		Control group	
		df	**χ^2**	**df**	**χ^2**
1.	**Habit of smoking**	2	0.811	2	1.618
2.	**If yes, duration of smoking**	2	5.025	2	0.8
3.	**Habit of alcoholism**	2	0.737	2	0.522
4.	**If yes, duration of alcoholism**	1	0.194	1	0.625
5.	**Dietary pattern**	2	1.297	2	1.86
6.	**Habit of wearing foot wear**	2	1.014	2	0.213
7.	**If yes, type of foot wear**	4	1.211	4	4.086
8.	**If special chappals, its type**	1	0.6	-	-

* significant ($p<0.05$)

The above table shows that, in the experimental and in the control group, there was no significant association of the diabetic wound status with their selected personal variables. Hence the formulated research hypothesis H_2 was rejected in experimental and control group.

Table- 4.9:

Chi-square test on wound status with their selected illness related variables in the experimental and control group

n=60

Sl. No.	Illness related Variables	Experimental group		Control group	
		df	χ^2	df	χ^2
1.	**Type of Diabetes Mellitus**	2	0.315	-	-
2.	**Whether on anti diabetic treatment**	4	5.887	4	2.352
3.	**Duration of illness**	6	3.699	6	10.76
4.	**Duration of diabetic foot ulcer**	4	4.783	4	4.65
5.	**Whether on diabetic diet**	4	2.261	4	30.12*

* significant ($p<0.05$)

The above table shows that, in the experimental group, there was no significant association of the diabetic wound status with their selected illness related variables. Hence the formulated research hypothesis H_2 was rejected.

In the control group, there was a significant association of the diabetic wound status with their selected illness related variable diabetic diet at $p<0.05$ level. Hence the formulated research hypothesis H_2 was retained to the illness related variable, diabetic diet only.

Summary

This chapter dealt with data analysis and interpretation in the form of statistical values based on the objectives. Here the frequency and percentage was used to distribute the patients with diabetic foot ulcer according to their demographic variables and pre test level of diabetic wound status. The independent 't' test was used to evaluate the effectiveness of honey dressing on level of wound status. The chi-square analysis was used to associate the level of diabetic wound status with their selected demographic variables.

CHAPTER –V

DISCUSSION

This chapter discusses the findings of the study derived from the descriptive and inferential statistics. This study was conducted to evaluate the effectiveness of honey dressing on diabetic wound status among patients with diabetic foot ulcer in urban communities, Salem.

Description of the Demographic Variables

The demographic variables were collected through structured interview schedule and wound status was assessed by Bates-Jensen Wound Assessment Tool. The wound status was assessed before and after the administration of honey dressing.

- The investigator found that, in the experimental group, 19(63.33%) patients were in the age group of 60-65 years and in the control group, 18(66.67%) patients were in the age group of 60-65 years. This study was supported by **Widatalla, A. H., et. al., (2009),** who did a study on implementation of diabetic foot ulcer classification system. In his study, 2,321 patients were studied and about 70% of them were in the age group between 60-65 years.
- In the experimental group, 17(56.67%) were males whereas in the control group, 20(66.67%) were males. This study was supported by **Singh, A., (2005),** He conducted a randomized controlled trial on comparison between ultrasound wound debridement and sharp debridement in diabetic foot ulcer. 33 ulcers were in male patients where as 27 were in female patients.
- In the experimental group, 11(36.67%) were graduates while in the control group, 14(46.67%) have studied up to 6^{th} to 12^{th} standard. **Rosemine, N., (2008),**

conducted a study on effectiveness of structured teaching programme on prevention of foot complications among patients with diabetes mellitus, Nagercoil. She found that 45-75% of them were literates.

- In the experimental group, 8(26.67%) were private employees and in the control group, 12(40%) were private employees.
- In the experimental group, almost all 29(96.67%) of them were of type II diabetes and in the control group all 30(100%) of them were of type II diabetes. **Ribu, L., et. al, (2006),** studied the health-related quality of life among patients with diabetes and foot ulcers: association with demographic and clinical characteristics. He identified in his study that 29% had Type 1 diabetes.
- In the experimental and in the control group, 19(63.33%) were on irregular anti-diabetic treatment.
- In the experimental group, 19(63.33%) of the patients had diabetes for more than 10 years and in the control group, majority, i.e., 24(80%) of them had diabetes for more than 10 years. This was also supported by **Levin, M. E., (2008),** who has identified in his study that the prevalence of diabetic foot ulcer increases with increased duration of diabetes mellitus.
- In the experimental group, majority, i.e., 25(83.33%) of the patients had diabetic foot ulcer for less than 1 year and in the control group, almost all, i.e., 27(90%) of them had diabetic foot ulcer for less than 1 year. **Vetriselvi, (2009),** conducted a study on effectiveness of infrared lamp therapy among clients with diabetic foot ulcer, Chennai. She found that 46.7% of the patients had diabetic foot ulcer for less than 6 months.

- In the experimental group, 11(36.67%) patients had habit of smoking and in the control group, 12(40%) of them had habit of smoking. This study was supported by **Chitra, N., (2005),** in her study to assess the diabetic ulcer healing before and after infrared lamp therapy at Gopi hospital. She found that 20% of the patients had the habit of smoking.
- In the experimental group, 9(30%) patients had smoking for above 10 years and in the control group, 10(33.33%) among them had smoking habit for above 10 years.
- In the experimental group, 7(23.33%) of the patients had the habit of alcoholism and in the control group, 10(33.33%) of them had the habit of alcoholism.
- In the experimental group, 6(20%) of them were alcoholic for more than 10 years and in the control group, 8(26.67%) among them were alcoholic for more than 10 years.
- In the experimental group, 22(73.33%) patients were non-vegetarians and in the control group, majority patients, i.e., 25(83.33%) were non-vegetarians.
- In the experimental group, 18(60%) were on irregular diabetic diet while in the control group, 21(70%) were on irregular diabetic diet.
- In the experimental group, almost all, i.e., 27(90%) had the habit of wearing foot wear and in the control group, 26(86.67%) had the habit of wearing foot wear.
- In the experimental group, 17(66.67%) of them wear slippers and in the control group, 14(46.67%) of them wear slippers.
- In the experimental group, 6(20%) among them wear special chappals whereas in the control group, 7(23.33%) among them wear special chappals.

- In the experimental group, among the 6, 4(13.33%) wear MCR chappals and the control group, among the 7, 4(13.33%) wear MCR chappals.

The first objective of the study was to assess the diabetic wound status among patients with diabetic foot ulcer in experimental and control group.

In the experimental group, 2(6.67%) patients had mildly unhealthy wound status, majority, i.e., 23(76.67%) of them had moderately unhealthy wound status and 5(16.67%) had severely unhealthy wound status during pre-test. In the control group, 1(3.33%) patient had mildly unhealthy wound status, majority, i.e., 23(76.67%) of them had moderately unhealthy wound status and 6(20%) had severely unhealthy wound status during their pre-test.

In the experimental group, 6(20%) patients had mildly unhealthy wound status, majority, i.e., 24(80%) of them had moderately unhealthy wound status and none had severely unhealthy wound status in post test. In the control group, 1(3.33%) patient had mildly unhealthy wound status, majority 23(76.67%) of them had moderately unhealthy wound status and 6(20%) had severely unhealthy wound status during their pre-test and post-test.

This study was supported by **Farnsworth, & Paulman, (2005).** In their study, about 50% to 60% of serious foot infections are complicated by osteomyelitis, and 10% to 20% of mild to moderate infections are likely to involve the bone. 25% of foot infections in persons with diabetes will spread to subcutaneous tissues or bone. From these studies, it was found that moderate and severe diabetic wound status are more common than mild diabetic wound status.

The second objective was to evaluate the effectiveness of honey dressing on diabetic wound status of patients with diabetic foot ulcer in experimental group.

In the experimental group, the post test mean score of diabetic wound status was 29.13 ± 7.73 and in the control group, the post test mean score was 33.77 ± 5.35. The 't' value was 2.28 which shows that honey was effective in improving the diabetic wound status of patients with diabetic foot ulcer in experimental group at $p<0.05$ level. Hence the formulated research hypothesis H_1 was retained.

This study was supported by **Medhi, B., et. al., (2005),** who conducted a meta-analysis on topical application of honey in the treatment of wound healing. The aim of the study was to evaluate the efficacy of topical application honey in observational studies as well as in controlled clinical trials in the treatment of wound healing. A systematic literature search was carried out from 1966 to 31 July 2008 in Pubmed, Medline, Embase, Cochrane database using the appropriate search key words. They found 5 observational studies with 160 patients while 963 cases in 10 controlled clinical trials where 511 patients were treated with honey. Efficacy was found highly efficacious in observational studies and in controlled clinical trials. Most of the patients reported with complete healing of 99% within 2-9 weeks. So based on the above trials it was concluded that topical application of honey is useful for the treatment for wound healing, but to fully establish its efficacy, larger prospective double blind study is required in near future.

The third objective was to associate the diabetic wound status among patients with diabetic foot ulcer in experimental and control with their selected demographic variables.

In the experimental group, there was no significant association of the diabetic wound status with their selected biographic variables. Hence the formulated research hypothesis H_2 was rejected.

In the control group, there was a significant association of the diabetic wound status with their selected biographic variables like age and occupation at $p<0.05$ level. Hence the formulated research hypothesis H_2 was retained to biographic variables like age and occupation only.

In the experimental and in the control group, there was no significant association of the diabetic wound status with their selected personal variables. Hence the formulated research hypothesis H_2 was rejected in experimental and control group.

In the experimental group, there was no significant association of the diabetic wound status with their selected illness related variables. Hence the formulated research hypothesis H_2 was rejected.

In the control group, there was a significant association of the diabetic wound status with their selected illness related variable diabetic diet at $p<0.05$ level. Hence the formulated research hypothesis H_2 was retained to the illness related variable, diabetic diet only.

Ribu, L., et.al., (2006), conducted a comparison of the health-related quality of life in patients with diabetic foot ulcers, with a diabetes group and a non-diabetes group from the general population and says that the most important socio-demographic characteristic that

differed between the diabetic foot ulcer patients and the diabetes population was that significantly more of the foot ulcer patients were men living alone, less educated, and not working.

Summary

The discussion was made in this chapter based the objectives of the study and its relation with similar studies conducted by other investigators. All the three objectives have been obtained and the two formulated research hypotheses were retained in this study.

CHAPTER – VI

SUMMARY, CONCLUSION, IMPLICATIONS AND RECOMMENDATIONS

This chapter consists of four sections. In the first two sections, the summary and the conclusion are presented. In the last two sections, the implications for nursing practice and the recommendations for further research are presented.

Summary

The purpose of this study was to evaluate the effectiveness of honey dressing on diabetic wound status among patients with diabetic foot ulcer in urban communities, Salem. The Quasi experimental research design (Non equivalent control group prê-test post test design) was used in this study.

A total of 60 patients who met the criteria were selected from the urban communities. The investigator first introduced her to the patients and developed good rapport with them. The conceptual framework for the study was based on the Pender's Health Promotion Model. The instrument used in this study consisted of two sections, Section- A was demographic variables; Section- B was Bates-Jensen Wound Assessment Tool.

The data were analysed using descriptive and inferential statistics. To test the hypotheses, independent 't' test and chi-square were used. The 0.05 level of significance was used to test the hypotheses.

- The investigator found that, in the experimental group, 19(63.33%) patients were in the age group of 60-65 years and in the control group, 18(66.67%) patients were in the age group of 60-65 years.

- In the experimental group, 17(56.67%) were males whereas in the control group, 20(66.67%) were males.
- In the experimental group, 11(36.67%) were graduates while in the control group, 14(46.67%) have studied up to 6^{th} to 12^{th} standard.
- In the experimental group, 8(26.67%) were private employees and in the control group, 12(40%) were private employees.
- In the experimental group, almost all, i.e., 29(96.67%) of the patients were of type II diabetes and in the control group all 30(100%) of them were of type II diabetes.
- In the experimental and in the control group, 19(63.33%) were on irregular anti-diabetic treatment.
- In the experimental group, 19(63.33%) of the patients had diabetes for more than 10 years and in the control group, majority, i.e., 24(80%) of them had diabetes for more than 10 years.
- In the experimental group, majority, i.e., 25(83.33%) of the patients had diabetic foot ulcer for less than 1 year and in the control group, almost all, i.e., 27(90%) of them had diabetic foot ulcer for less than 1 year.
- In the experimental group, 11(36.67%) patients had habit of smoking and in the control group, 12(40%) of them had habit of smoking.
- In the experimental group, 9(30%) among them had smoking for above 10 years and in the control group, 10(33.33%) among them had smoking habit for above 10 years.
- In the experimental group, 7(23.33%) of the patients had the habit of alcoholism and in the control group, 10(33.33%) of them had the habit of alcoholism.

- In the experimental group, 6(20%) of them were alcoholic for more than 10 years and in the control group, 8(26.67%) among them were alcoholic for more than 10 years.
- In the experimental group, 22(73.33%) patients were non-vegetarians and in the control group, majority of the patients, i.e., 25(83.33%) were non-vegetarians.
- In the experimental group, 18(60%) were on irregular diabetic diet while in the control group, 21(70%) were on irregular diabetic diet.
- In the experimental group, almost all, i.e., 27(90%) patients had the habit of wearing foot wear and in the control group, 26(86.67%) had the habit of wearing foot wear.
- In the experimental group, 17(66.67%) of them wear slippers and in the control group, 14(46.67%) of them wear slippers.
- In the experimental group, 6(20%) among them wear special chappals whereas in the control group, 7(23.33%) among them wear special chappals.
- In the experimental group, among the 6, 4(13.33%) wear MCR chappals and in the control group, among the 7, 4(13.33%) wear MCR chappals.
- In the experimental group, 2(6.67%) patients had mildly unhealthy wound status, majority, i.e., 23(76.67%) of them had moderately unhealthy wound status and 5(16.67%) had severely unhealthy wound status in pre-test.
- In the control group, 1(3.33%) patient had mildly unhealthy wound status, majority, i.e., 23(76.67%) of them had moderately unhealthy wound status and 6(20%) had severely unhealthy wound status in pre-test.

- In the experimental group, 6(20%) patients had mildly unhealthy wound status, majority, i.e., 24(80%) of them had moderately unhealthy wound status and none had severely unhealthy wound status in post test.
- In the control group, 1(3.33%) patient had mildly unhealthy wound status, majority 23(76.67%) of them had moderately unhealthy wound status and 6(20%) had severely unhealthy wound status in post-test.
- In the experimental group, the pre-test and post-test mean score of diabetic wound status was 35 ± 8.63 and 29.13 ± 7.73 respectively. In the control group, the pre-test and post-test mean score was 36.43 ± 8.46 and 33.77 ± 5.35 respectively. The mean difference of diabetic wound status in the experimental and control group was 5.87 and 2.66 respectively. Thus it became evident that there was a difference of diabetic wound status in the experimental and control group.
- In the experimental group, the post test mean score of diabetic wound status was 29.13 ± 7.73 and in the control group, the post test mean score was 33.77 ± 5.35. The 't' value was 2.28 which shows that honey was effective in improving the diabetic wound status of patients with diabetic foot ulcer in experimental group at $p< 0.05$ level. Hence the formulated research hypothesis H_1 was retained.
- In the experimental group, there was no significant association of the diabetic wound status with their selected biographic variables. Hence the formulated research hypothesis H_2 was rejected.
- In the control group, there was a significant association of the diabetic wound status with their selected biographic variables like age and occupation at $p< 0.05$

level. Hence the formulated research hypothesis H_2 was retained to biographic variables like age and occupation only.

- In the experimental and in the control group, there was no significant association of the diabetic wound status with their selected personal variables. Hence the formulated research hypothesis H_2 was rejected in experimental and control group.
- In the experimental group, there was no significant association of the diabetic wound status with their selected illness related variables. Hence the formulated research hypothesis H_2 was rejected.
- In the control group, there was a significant association of the diabetic wound status with their selected illness related variable diabetic diet at $p<0.05$ level. Hence the formulated research hypothesis H_2 was retained to the illness related variable, diabetic diet only.

Conclusion

This study was done to evaluate the effectiveness of honey dressing on diabetic wound status of patients with diabetic foot ulcer in urban communities, Salem. The result of this study showed that all the patients had improved wound status after honey dressing. In the experimental group, there was no significant association of the diabetic wound status with their selected demographic variables whereas in the control group, there was a significant association of the diabetic wound status with their selected demographic variables like age, occupation and diabetic diet.

Implications

India is the country which ranks first in the rate of diabetes and the most important complication among them is the diabetic foot ulcer which leads to amputation

and thereby permanent disability. Hence, there is a need to have appropriate management for diabetic foot ulcer. The result of the study proved that honey dressing can be used effectively in the management of diabetic foot ulcer.

Nursing service

- It emphasizes more on self care rather than allowing patients and their families to become dependent on health care personnel.
- There is a need for integration of the indigenous systems of medicine into the general health care services.
- In-service education can be provided to the peripheral level health workers and train them on the alternative therapies available.
- All the diabetic patients with foot ulcer can be taught about the importance of management of diabetic foot ulcer.
- All the diabetic patients with foot ulcer can be taught about the advantages of honey dressing in the management of diabetic foot ulcer.
- All the diabetic patients with foot ulcer can be taught the self dressing techniques and they can be made efficient to manage their foot ulcer at home setup itself.

Nursing education

- Nurse educators should emphasize the concept of family and self care and encourages student nurses to appreciate the role of the nurse as an educator of the patient and family.
- Nurse educator should take initiative in organizing continuing education program for nurses on effectiveness of honey dressing in management of diabetic foot ulcer.

- The nursing curriculum needs to update the nursing students to make them be aware of all the recent researches present in the field and implement them.

Nursing administration

- The nurse administrator coordinates her work along with the staffs, to encourage them to do selected alternative nursing measures like honey dressing in the management of diabetic foot ulcer.
- Nursing administrator should organize in service educational program to the staffs regarding the management of diabetes and its complications.

Nursing research

- Since nursing studies in this area are few, this study can be used as a reference for doing further research study.
- This study can be used as a baseline for future studies to build upon.
- Nursing research need to be done to find out various other innovative measures in the management of diabetes and its complications.
- Research can be conducted on various populations at various settings.

Recommendations

- A similar study can be done using large patients.
- A similar study can be conducted in primary health centre.
- A similar study can be undertaken by allotting more time on data collections.
- A similar study can be done in rural communities.
- A similar study can be done among patients with other types of ulcers.

- A comparative study can be done to determine the effectiveness of natural honey and other synthetic preparation of honey among experimental and control group of patients with diabetic foot ulcer.

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APPENDIX- A

Letter Seeking Permission to Conduct a Research Study

03.07.2010

To

The Managing Director,

M.G. Diabetic Centre,

Alagapuram, Salem- 16.

Respected Sir,

Sub: Permission to conduct Research study - reg.

This is to introduce **Ms. Johnsy Rani. T.,** a final year M.Sc., (Nursing) student of our College. She is conducting a research study to be submitted to The Tamil Nadu Dr. M.G.R. Medical University, Chennai in partial fulfilment of the University requirement for the award of M.Sc. (Nursing) degree.

Topic: "A study to Evaluate the Effectiveness of Honey Dressing on Diabetic Wound Status among Patients with Diabetic Foot Ulcer in Urban Communities, Salem".

I request you to kindly provide her the needed help to conduct this Research Study in your esteemed institution from 05.07.2010 to 31.07.2010. She will adhere to the institutional policies and regulations.

Thanking you.

Yours sincerely,

Place: Salem

(Prof. A. Jayasudha)

APPENDIX- B

Tool for Data Collection

Section- A: Structured Interview Schedule to Assess the Demographic Data - English

Instructions

The investigator collects the following data from the subjects and place a tick mark (✓) in the appropriate column given against each item.

Date : ……

Sample No.: ...……

1. Age
   a) 30 - 39 years ☐
   b) 40 - 49 years ☐
   c) 50 - 59 years ☐
   d) 60 -65 years ☐
2. Sex
   a) Male ☐
   b) Female ☐
3. Educational status
   a) No formal education ☐
   b) 1^{st} - 5^{th} Standard ☐
   c) 6^{th} - 12^{th} Standard ☐
   d) Graduate ☐
4. Occupation
   a) Unemployed ☐
   b) Private employee ☐
   c) Government employee ☐
   d) Business ☐
   e) Pensioners ☐
5. Type of Diabetes Mellitus
   a) Type 1 DM ☐
   b) Type 2 DM ☐

6. Whether on anti diabetic treatment

a) Regular treatment

b) Irregular treatment

c) No treatment

7. Duration of diabetes

a) Less than 1 year ☐

b) 1 - 3 years ☐

c) 4 - 6 years ☐

d) 7 - 9 years ☐

e) 10 years and above ☐

8. Duration of diabetic foot ulcer

a) Less than 1 year ☐

b) 1 - 3 years ☐

c) 4 - 6 years ☐

d) 7 - 9 years ☐

e) 10 years and above

9. Habit of smoking

a) Yes ☐

b) No ☐

10. If yes, duration of smoking

a) Less than 1 year ☐

b) 1 - 3 years ☐

c) 4 - 6 years ☐

d) 7 - 9 years ☐

e) 10 years and above ☐

11. Habit of alcoholism

a) Yes ☐

b) No ☐

12. If yes, duration of alcoholism
    a) Less than 1 year ☐
    b) 1-3 years ☐
    c) 4-6 years ☐
    d) 7-9 years ☐
    e) Above 10 years ☐
13. Dietary pattern
    a) Vegetarian ☐
    b) Non -vegetarian ☐
14. Whether on diabetic diet
    a) Regular diabetic diet ☐
    b) Irregular diabetic diet ☐
    c) No ☐
15. Habit of wearing foot wear
    a) Yes ☐
    b) No ☐
16. If yes, type of foot wear
    a) Slippers ☐
    b) Shoes ☐
    c) Special chappals ☐
17. If special chappals, its type
    a) MCR chappals ☐
    b) Doctors chappals ☐
    c) Acupressure chappals ☐

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<. 60-65 taJ ☐

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M. Ïšy¤juÁ ☐

Ï. jåah® Cêa® ☐

<. muR Cêa® ☐

c. XŒÎ bg‰wt® ☐

5. r®¡fiu nehæ‹ tif

m. tif –I ☐

M. tif –II ☐

6. r®¡fiu nehŒ¡fhd Á»¢iræš cŸÇuh?

m. M« ☐

M. Ïšiy ☐

7. nehahš ghÂ¡f¥g£LŸs fhy«

m. 1 tUl¤Â‰F Fiwthf ☐

M. 1-3 tUl§fŸ ☐

Ï. 4-6 tUl§fŸ ☐

<. 7-9 tUl§fŸ ☐

c. 10 tUl§fŸ k‰W« mj‰F nkš ☐

8. r®¡fiu nehahš V‰gL« fhšò© fhz¥gL« fhy«.

m. 1 tUl¤Â‰F Fiwthf ☐

M. 1-3 tUl§fŸ ☐

Ï. 4-6 tUl§fŸ ☐

<. 7-9 tUl§fŸ ☐

c. 10 tUl§fŸ k‰W« mj‰F nkš ☐

9. òif¥Ão¡F« gH¡f« cŸsjh?

m. M« ☐

M. Ïšiy ☐

10. M« våš, v›tsÎ fhykhf?

m. 1 tUl¤Â‰F Fiwthf ☐

M. 1-3 tUl§fŸ ☐

Ï. 4-6 tUl§fŸ ☐

<. 7-9 tUl§fŸ ☐

c. 10 tUl§fŸ k‰W« mj‰F nkš ☐

11. kJ mUªJ« gH¡f« cŸsjh?

m. M« ☐

M. Ïšiy ☐

12. M« våš, v›tsÎ fhykhf?

m. 1 tUl¤Â‰F Fiwthf ☐

M. 1-3 tUl§fŸ ☐

Ï. 4-6 tUl§fŸ ☐

<. 7-9 tUl§fŸ ☐

c. 10 tUl§fŸ k‰W« mj‰F nkš ☐

13. czÎ¥ gH¡f«

m. irt« ☐

M. mirt« ☐

14. r®¡fiu nehŒ¡fhd czÎ f£L¥gh£oš cŸÇuh?

m. r®¡fiu nehŒ¡fhd Óuhd czÎ f£L¥ghL ☐

M. r®¡fiu nehŒ¡fhd Óu‰w czÎ f£L¥ghL ☐

Ï. r®¡fiu nehŒ¡fhd czÎ f£L¥ghL Ïšiy ☐

15. fhyâ mâÍ« gH¡f« cŸsjh?

m. M« ☐

M. Ïšiy ☐

16. M« våš, fhyâæ‹ tif

m. nyrhd js®ªj brU¥ò ☐

M. ó£° ☐

Ï. énrõ tifahd brU¥ò ☐

17. énrõ tifahd brU¥ò våš, F¿¥ÃLf

m. v«.Á.M®. brU¥ò ☐

M. lh¡l® brU¥ò ☐

Ï. m~FÃuõ® brU¥ò ☐

Section- B: Bates- Jensen Wound Assessment Tool

- Complete the rating sheet to assess wound status.
- Evaluate each item by picking the response that best describes the wound and put a tick mark (✓) against each item.

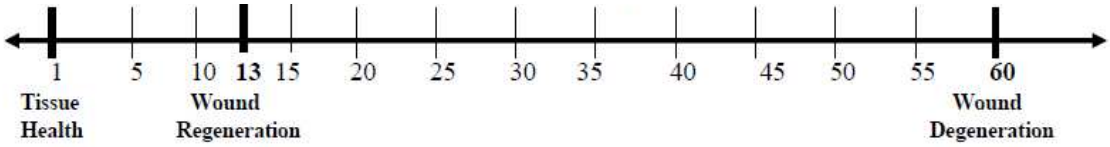
Item	Assessment	score	Date				
1.Size	• Length x width <4 sq cm • Length x width 4 to <16 sq cm • Length x width 16.1 to <36 sq cm • Length x width 36.1 to <80 sq cm • Length x width >80 sq cm	1 2 3 4 5					
2. Depth	• Non-blanchable erythema on intact skin • Partial thickness skin loss involving epidermis &/or dermis • Full thickness skin loss involving damage or necrosis of subcutaneous tissue; may extend down to but not through underlying fascia; &/or mixed partial & full thickness &/or tissue layers obscured by granulation tissue • Obscured by necrosis • Full thickness skin loss with extensive destruction, tissue necrosis or damage to muscle, bone or supporting structures	1 2 3 4 5					

3. Edges	• Indistinct, diffuse, none clearly visible • Distinct, outline clearly visible, attached, even with wound base • Well-defined, not attached to wound base • Well-defined, not attached to base, rolled under, thickened • Well-defined, fibrotic, scarred or hyperkeratotic	1 2 3 4 5					
4. Undermining	• None present • Undermining < 2 cm in any area • Undermining 2 to 4 cm involving < 50% wound margins • Undermining 2 to 4 cm involving > 50% wound margins • Undermining > 4 cm or Tunneling in any area	1 2 3 4 5					
5.Necrotic tissue type	• None visible • White/grey non-viable tissue &/or non-adherent yellow slough • Loosely adherent yellow slough • Adherent, soft, black eschar • Firmly adherent, hard, black eschar	1 2 3 4 5					
6.Necrotic tissue amount	• None visible • < 25% of wound bed covered • 25% to 50% of wound covered • > 50% and < 75% of wound covered • 75% to 100% of wound covered	1 2 3 4 5					

7.Exudate type	• None • Bloody • Serosanguineous: thin, watery, pale red/pink • Serous: thin, watery, clear • Purulent: thin or thick, opaque, tan/yellow, with or without odor	1 2 3 4 5					
8.Exudate Amount	• None, dry wound • Scant, wound moist but no observable exudate • Small • Moderate • Large	1 2 3 4 5					
9.Skin Color surrounding wound	• Pink or normal for ethnic group • Bright red &/or blanches to touch • White or grey pallor or hypopigmented • Dark red or purple &/or non-blanchable • Black or hyperpigmented	1 2 3 4 5					
10. Peripheral Tissue Edema	• No swelling or edema • Non-pitting edema extends <4 cm around wound • Non-pitting edema extends ≥4 cm around wound • Pitting edema extends < 4 cm around wound • Crepitus and/or pitting edema extends >4 cm around wound	1 2 3 4 5					

11.Peripheral Tissue Induration	• None present • Induration, < 2 cm around wound • Induration 2 to 4 cm extending < 50% around wound • Induration 2 to 4 cm extending ≥ 50% around wound • Induration > 4 cm in any area around wound	1 2 3 4 5					
12.Granulation Tissue	• Skin intact or partial thickness wound • Bright, beefy red; 75% to 100% of wound filled &/or tissue overgrowth • Bright, beefy red; < 75% & > 25% of wound filled • Pink, &/or dull, dusky red &/or fills ≤ 25% of wound • No granulation tissue present	1 2 3 4 5					
13.Epithelialization	• 100% wound covered, surface intact • 75% to <100% wound covered &/or epithelial tissue extends to >0.5cm into wound bed • 50% to <75% wound covered &/or epithelial tissue extends to <0.5cm into wound bed • 25% to < 50% wound covered • < 25% wound covered	1 2 3 4 5					
	TOTAL SCORE						

Wound Status Continuum



- Plot the total score on the Wound Status Continuum by putting an "X" on the line and the date beneath the line.
- Plot multiple scores with their dates to see at a glance regeneration or degeneration of the wound.

Procedure for Honey Dressing

Definition

It refers to the clean dressing procedure of cleansing the wound with normal saline, filling 3/4th depth of the wound with honey, placing a honey spreaded gauze pad over the wound and covering the wound with gauze bandage or plaster.

Indications

Patients with superficial, full thickness and deep diabetic ulcers.

Equipments Needed

- Scissor
- Small bowls - 2
- Cotton balls
- Gauze pieces
- Gauze pad
- Bandage roll
- Adhesive plaster
- Paper bag
- K - basin
- Normal saline
- Honey

Preparation of the Equipments

- Pour small amount of normal saline and honey as required into the two different small bowls.

Preparation of the Patient

- Explain the procedure to the patient and win the confidence and co-operation.
- Explain the patient how he/she can co-operate in the procedure.
- Place the patient in a comfortable and relaxed position.
- Untie the bandage or adhesive and remove them.

Procedure

- Wash hands thoroughly with soap and water.
- Clean the wound with the normal saline and gauze piece from the centre to periphery.
- Discard the used gauze piece after each stroke into the paper bag.

- ❖ Dry the wound with gauze pieces after cleaning the wound.
- ❖ Pour honey into 3/4th depth of the wound.
- ❖ Spread honey on the gauze piece and place over the wound.
- ❖ Place a dry gauze piece and then a gauze pad above the honey spread gauze piece.
- ❖ Cover the wound with the bandage roll if it is large or with plaster if it is small.

After Care

- ❁ Ask the patient to collect all the waste in the paper bag, fold it and dispose them by burning.
- ❁ Clean the used scissor and bowls in cold water using soap.
- ❁ Dry them using a piece of gauze.
- ❁ Replace all the articles safely.
- ❁ Wash hands.
- ❁ Record the time of procedure and the signature.

fhèš V‰gL« Mwhj ò©zhdJ r®¡fiu nehæ‹ äf¥bghJthd Ã‹éisÎ MF«. nj‹ cgnah»¤J ò©f£L« KiwahdJ nknyh£lkhd k‰W« MHkhd ò© éiuthf Fzkila äfÎ« cjÎ»wJ.

njitahd cgfuz§fŸ

- f¤jç¡nfhš
- Á¿a »©z§fŸ - 2
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Á¿jsÎ riy‹ Âut« k‰W« nj‹ M»at‰iw jå¤jåahf ÏU Á¿a »©z§fëš C‰¿ it¤J¡bfhŸsÎ«.

nehahëia¤ jahç¤jš

- ♣ brŒKiwia nehahëæl« és¡» mtuJ e«Ã¡ifÍ« x¤JiH¥igÍ« bgwÎ«.
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brŒKiw

- ✷ iffis e‹whf nrh¥Ã£L fGtÎ«.
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- ✷ cgnah»¤j gŠR cU©ilfis Á¿a Ãsh°o¡ Ftisæš nghlÎ«.
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f£L¥ngh£l¥Ã‹ brŒa nt©oait

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- šyil¤Jâ J©odhš mt‰iw e‹whf¤ Jil¡fÎ«,
- cgfuz§fis ghJfh¥ghf vL¤J it¡fÎ«.
- iffis e‹whf nrh¥ò ngh£L fGtÎ«.
- ò© R¤j« brŒj neu¤ij bfhL¡f¥g£LŸs m£ltizæš F¿¥Ã£L, ò© f£L ngh£lt® mÂš ifbah¥gälÎ«.
- ò© R¤j« brŒa¥g£L f£L¥ nghl¥gléšiy våš, mÂš fhuz¤ij¡ F¿¥ÃlÎ«.

Checklist of Procedure for Honey Dressing

Instructions

The investigator observes the procedure performed by the patients and place a tick mark (√) in the appropriate column.

Sl. No.	Steps of procedure	Yes	No
1.	Be in comfortable and relaxed position		
2.	Untie the bandage or adhesive and remove them		
3.	Wash hands thoroughly with soap and water.		
4.	Remove the dressings and put it in the K-basin.		

5.	Clean the wound with the normal saline and gauze from the centre to periphery		
6.	Discard the used swabs after each stroke into the paper bag		
7.	Dry the wound with gauze piece after cleaning the wound		
8.	Pour honey into 3/4th depth of the wound		
9.	Spread honey over a gauze piece and place it over the wound		
10.	Place a dry gauze pad above the honey spreaded gauze piece		
11.	Cover the wound with the bandage roll if it is large or with plaster if it is small		
12.	Collect all the waste in the paper bag, fold it and dispose them by burning		
13.	Clean the used scissor and bowls in cold water using soap		
14.	Dry them using a piece of gauze		
15.	Replace all the articles safely		
16.	Wash hands		
17.	Record the time of procedure and the signature in the daily record sheet		

Daily Record Sheet of Subjects on Honey Dressing- English

Instructions

Ask the patient's primary care giver to maintain this record daily.

Sl. No.	**Date**	**Honey Dressing**		**Signature of the Primary Care Giver**	**Signature of the Investigator**
		Done (Mention the Time)	**Not done (Mention the reason)**		

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APPENDIX- C

Letter Requesting Opinion and Suggestions of Experts for Content Validity of the Research Tools

From

Ms. Johnsy Rani.T.,
Final Year M.Sc., (N)
Sri Gokulam College of Nursing,
Salem, Tamil Nadu.

To

Respected Sir/ Madam,

Sub: Requesting opinion and suggestions of experts for establishing content validity of the research tools.

I, **Ms. Johnsy Rani.T.,** a Final Year M.Sc., (Nursing) student of Sri Gokulam College of Nursing, Salem, in partial fulfilment of Master's Degree in Nursing, have selected the topic mentioned below for the research project to be submitted to The Tamil Nadu Dr. M.G.R. Medical University, Chennai.

Topic: "A study to Evaluate the Effectiveness of Honey Dressing on Diabetic Wound Status among Patients with Diabetic Foot Ulcer in Urban Communities, Salem".

I kindly request you to validate the structured interview schedule tool and content of estimation of haemoglobin and blood glucose level, Bates-Jensen Wound Assessment Tool and Honey Dressing and give your expert opinion for necessary modification. I will be grateful to you for this.

Thanking you.

Place : Salem
Date :

Yours' sincerely,
(Ms. Johnsy Rani. T.)

Enclosed:

1. Tool for collection of data
2. Procedure for honey dressing, Checklist of procedure for honey dressing, Daily record sheet of subjects on honey dressing.
3. Certificate of validation

APPENDIX- D

Certificate of Validation

This is to certify that the tool developed by **Ms. Johnsy Rani.T.,** Final Year M.Sc (N) student, Sri Gokulam College of Nursing, Salem, (Affiliated to The Dr. M.G.R. Medical University) is validated and can proceed with this tool and conduct the main study for dissertation entitled **"A study to Evaluate the Effectiveness of**

Honey Dressing on Diabetic Wound Status among Patients with Diabetic Foot Ulcer in Urban Communities, Salem".

Date : Signature:

Name and designation:

APPENDIX- E

List of Experts for Content Validity

1. **Dr. P. Alagia Nambi, M.D.,**
   Consultant Diabetologist,

   Sri Gokulam Hospital,
   Salem.

2. **Dr. K. Selvakumari, M.D.,**

Consultant Physician,
Sri Gokulam Hospital,
Salem.

3. **Dr. M. G. Uvaraj, M.D.,**
Chief Diabetologist,
M.G. Diabetic Centre and Research Institute,
Alagapuram,
Salem.

4. **Mr. K. Balasubramanian, M.Sc.(N),**
Professor,
Medical Surgical Nursing,
K.M.C.H. College of Nursing,
Coimbatore.

5. **Mrs. N. Anitha, M.Sc.(N),**
Professor,
Medical Surgical Nursing,
Sri Gokulam College of Nursing,
Salem.

6. **Mrs. N. Sumathi, M.Sc.(N),**
Professor,
Medical Surgical Nursing,
Vinayaka Mission Annapoorna College of Nursing,
Salem.

7. **Mr. M. Kandasamy, M.Sc.(N), Ph.D.,**
Associate Professor,

Community Health Nursing,
Sri Gokulam College of Nursing,
Salem.

8. **Mrs. M. Sumathy, M.Sc.(N),**
Associate Professor,
Community Health Nursing,
Vinayaka Mission Annapoorna College of Nursing,
Salem.

9. **Mrs. T. Suja, M.Sc.(N),**
Lecturer,
Community Health Nursing,
Sree Mookambika College of Nursing,
Kulsekharam.

10. **Mrs. P. Lalitha Vijay, M.Sc.(N),**
Professor,
Mental Health Nursing,
Sri Gokulam College of Nursing,
Salem.

APPENDIX-F

Certificate of Editing

CERTIFICATE

Certified that the dissertation paper titled **"A study to Evaluate the Effectiveness of Honey Dressing on Diabetic Wound Status among Patients with Diabetic Foot Ulcer in Urban Communities, Salem"** by **Ms. Johnsy Rani. T.,** has been checked for accuracy and correctness of English language usage, and that the language used in presenting the paper is lucid, unambiguous, free of grammatical / spelling errors and apt for the purpose.

Date :

Signature:

Name and designation:

APPENDIX - G